

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

4984F

Cop. 3

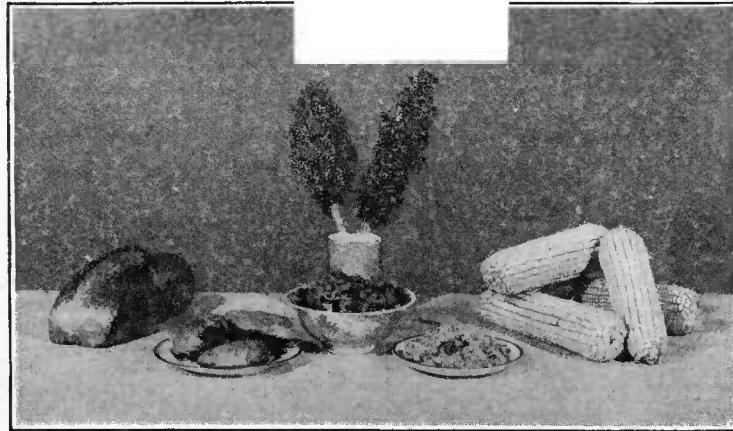
FARMERS' BULLETIN 817 *rev. April 1922*

HOW TO SELECT FOODS

II. CEREAL FOODS

CAROLINE L. HUNT and HELEN W. ATWATER
Specialists, Office of Home Economics

See revised
edition



UNITED STATES
DEPARTMENT OF AGRICULTURE

THE PURPOSE of this series of bulletins is to state in simple terms the main principles on which economical food selection must be based, not to give definite directions for obtaining food at low cost or to recommend any special foods or combinations of foods. Such rules would vary too much with locality and season to be of general or lasting value. It is simpler and more practical in the end for the housekeeper to know the general value of different foods and then choose according to that knowledge.

The present bulletin deals with foods rich in starch, and particularly with the cereals and foods made from them. These are mild-flavored, comparatively inexpensive foods which yield energy to the body. They also yield varying amounts of tissue-building and body-regulating substances. If they are combined with well-chosen materials from the other food groups, they can be used safely as the main part of the ration. With wise planning such a diet can be made adequate, attractive, and at the same time economical.

For a discussion of other phases of the subject of how to select foods see Farmers' Bulletins 808, "What the Body Needs"; 824, "Foods Rich in Protein"; and 1228, "A Week's Food for an Average Family."

Contribution from the States Relations Service

A. C. TRUE, Director

Washington, D. C.

Issued May, 1917; revised April, 1922

HOW TO SELECT FOODS.

II. CEREAL FOODS.

CONTENTS.

Page.		Page.	
Wise use of cereal foods -----	3	Breakfast cereals -----	14
Kinds of cereals -----	5	Cakes, pastries, puddings, sauces,	
Prepared cereals-----	6	and other dishes rich in cereal---	16
Dishes made of cereals-----	7	Economies with cereal foods-----	17
How much cereal food should be used -----	8	Potatoes and sweet potatoes used like cereals-----	21
Bread-----	9	Summary-----	21

WISE USE OF CEREAL FOODS.

In an earlier bulletin of this series¹ the diet as a whole was considered and a simple way of planning wholesome, economical, and attractive meals was suggested. The housekeeper was advised to think of the common food materials as grouped under five heads, and to make sure that the diet every day included something from each of the five groups.

The five groups are as follows:

(1) Fruits and vegetables. Without these there is danger that the diet may be lacking in bulk, mineral matters, and vitamines.

(2) Milk, cheese, eggs, meats, and other flesh foods. Without these there is danger that the diet may be lacking in some of the materials needed to make body protein.

(3) Cereals (wheat, oats, rye, corn, barley, and rice) and their products. Without these starch is lacking and the diet is either too costly or too low in protein. In a diet, which includes few dairy products, eggs, meats, and other flesh foods, vegetables, and fruits, whole grain cereals are needed for vitamines.

(4) Sugar, molasses, sirups, honey, and other sweets. Without these the diet would be lacking in sugar, valued as body fuel and for its flavor.

(5) Fats (butter, lard, meat fat, and olive, peanut, cottonseed, and other fats and oils). Without these the fat of the diet, which is needed for richness and flavor, would probably be too low in amount and would not be distributed satisfactorily among the other food materials.

In selecting foods from any one of the five groups the following points must be kept in mind:

(1) In each group there are low-priced foods and high-priced foods. In group 2, for example, there are low-priced and high-

¹ Farmers' Bul. 808 (1917). How to Select Foods.—I. What the Body Needs.

priced cuts of meat. In many cases the cheaper cuts are just as nourishing and useful as the more expensive ones. Those who wish to economize, therefore, should choose those from which they get the largest amount of nourishment for the smallest amount of money.

(2) It usually takes more time and skill to make the low-priced foods taste good than it does the higher-priced ones. For example, the flavor of the higher-priced cuts of meat can be developed by broiling or other quick processes of cookery. The lower-priced cuts, on the other hand, are often tough and require long cooking and frequently the addition of savory vegetables or other flavoring materials.

(3) In selecting and using the foods of any group care must be taken to prevent waste. This means calculating carefully how much will be needed, and also making skillful use of foods left over.

In the case of cereals a fourth point must be considered.

(4) Where economy is especially needed the lower-priced cereals should be used as freely as they can be without making the diet one-sided. In this they differ from such higher-priced foods as milk, meat, fruits, and vegetables, which, in case of need, must be cut down so far as they safely can be. To encourage the use of cereals housekeepers should—

(a) Provide the very best of bread; that is, bread that is well flavored, light, of good texture, and well baked.

(b) Take particular pains in cooking and salting the lower-priced breakfast cereals. The same rule applies to such foods as hominy, boiled rice, or macaroni, commonly served with meat or other protein-rich food at luncheon, dinner, or supper.

(c) Remember that, though large quantities of cereal foods may not seem attractive if served alone, they may be very appetizing if combined with small amounts of more highly-flavored or seasoned foods. A well-seasoned soup may lead to the eating of a large quantity of bread. A little savory meat or fish, salted or smoked, or a small quantity of cheese, may be used to flavor a fairly large dish of rice or macaroni.

This bulletin discusses the way in which cereal foods may be wisely used in the diet.

The term "cereal foods" may mean: (1) The kernels of corn, oats, rice, rye, wheat, etc.; (2) the flours, meals, breakfast foods, starches, and other products manufactured from them; or (3) bread, rolls, crackers, cakes, doughnuts, and other cooked foods in which flour is an important ingredient. It will be easier to understand their use in the diet if these three general forms are borne in mind.

KINDS OF CEREALS.

The most common cereals are wheat, rye, corn, oats, and rice. They differ somewhat in appearance, taste, and food value, but all have many features in common.

Besides the more common cereals named in the last paragraph there are a few others which may be briefly mentioned. Barley is one used chiefly in gruels or in soup. Buckwheat is not a cereal in the botanical sense of the word, but its seeds resemble the true cereals in general character and food value, so that it is usually classed with them. In this country it is chiefly used for making griddle cakes. The so-called grain sorghums, kafir, milo, feterita, and others, are cereals, the use of which is increasing in this country, especially in the semiarid sections of the Southwest. The heavy plumelike heads are shown in the picture on the cover of this bulletin. So far these sorghums have been used mainly as stock feed in the United States, but they are also coming more and more to be used as human food,² as they have been for a long time in other parts of the world.

The most abundant food material in cereals is starch, which serves the body as fuel. This makes up nearly three-quarters of most grains. The next most abundant material is protein, which supplies nitrogen for tissue building. This makes up about one-eighth of the wheat kernel, somewhat more of the oat kernel, and somewhat less of the rice and corn kernels. The proteins of the cereals are not efficient or complete, which means that they do not furnish everything needed to make body protein. They furnish almost everything, however, and can be completed by the use of small amounts of the proteins of meats, eggs, milk, and cheese, which quite usually form a part of the diet. There is also a little fat, particularly in corn and oats; it is found chiefly in the germ. Another important material is the "roughage," or cellulose, which is most abundant in the skin of the grain and which gives bulk to the diet. The kernels also contain actually small, but relatively high, proportions of mineral matters needed for body building and other purposes, and vitamins. The vitamins are in or near the germ and the outer coatings. Cereal products that include the germ and the bran are therefore far richer in vitamins than refined products.

The protein is not alike in all kinds of cereals. Part of that in wheat is a tough, elastic sort, called gluten. It is because of this gluten, which can be expanded into air bubbles, that light, porous bread can be made from wheat. Rye is most like wheat in the character of its gluten, though light, porous bread can not be made from it alone. Barley, buckwheat, corn, oats, and rice are so lacking in gluten that they can not be raised by yeast (see p. 9).

² U. S. Dept. Agr. Bul. 470 (1916). Studies on the Digestibility of the Grain Sorghums.

PREPARED CEREALS.

By prepared cereals are meant such manufactured goods as flours and meals, cracked wheat, steamed and rolled oats, puffed or flaked grains of all kinds, macaroni and other pastes, cornstarch, etc. They may or may not contain all of the original grain, and for this reason they differ more widely than the grains themselves in appearance, composition, and flavor. The cooking which some of them undergo during manufacture also causes changes. Of course, unless something is added to them, they contain no food material not present in the grains from which they are made.

Prepared cereals differ so much in form that their appearance gives little idea of the amount of nourishment they yield. For instance, the amount of flour which will fill a cup weighs 4 ounces; that of rice, 8 or 9 ounces; and that of flaked breakfast cereal, hardly half an ounce; and it is this weight rather than bulk or volume which indicates food value. Such differences in weight and volume must be remembered by those who wish to buy their food as cheaply as possible. Some breakfast foods retail at 48 cents a pound (15 cents for a 5-ounce package); others cost 5 cents or less a pound. The cheapest ones are usually those sold in bulk. The housekeeper, by grinding her own wheat, can get a cereal breakfast food for a still smaller sum. When wheat sells for \$2 a bushel the cost per pound is between 3 and 4 cents. This wheat can be prepared by washing, drying, and then grinding in an ordinary coffee mill.

One of the important differences between these preparations depends on whether or not the germ or any of the outer coating of the kernel has been left in. The coating consists mainly of bulky cellulose, but it also contains a large part of the important tissue-forming mineral compounds, and vitamines and germ are found in the grain. When the bran is left in, the preparation is more bulky and contains more of some food elements. On the other hand, it does not always keep as well and (in the case of flour) does not make as light bread, and is not so thoroughly digested. Evidently, then, the choice of cereal foods should depend on the purposes they are to serve. If bread or breakfast cereals are used as the chief part of a meal or of a diet which does not include much of vegetables, fruits, milk, and eggs, and which, therefore, may be lacking in bulk and mineral salts and vitamines, it is well to choose the brands that contain germ and bran. This should be especially remembered in considering the diet of children, for they need more body-building mineral compounds and vitamines than adults. If, on the other hand, the diet in general is varied and if flour is to be used for cakes, pastry, and general cooking, white flour is more useful than coarser whole-wheat or graham flour.

DISHES MADE OF CEREALS.

These include porridge and cereal mush, breads, crackers, cakes, puddings, pies, and others. There are even greater differences among cereal foods of this group as they appear on the table than among those from which they are prepared, because they are made in so many different ways and combined with so many different things. The cooking has made them pleasanter to eat. The differences in appearance are shown in figures 1, 2, 3, and 4.

Ordinarily more or less water or some other liquid is added in cooking cereals, and the water that they thus take up makes them much bulkier and at the same time more dilute. One cupful of uncooked oatmeal or rice, for instance, cooked with three cupfuls of water gives over four cupfuls when boiled, but the water, which

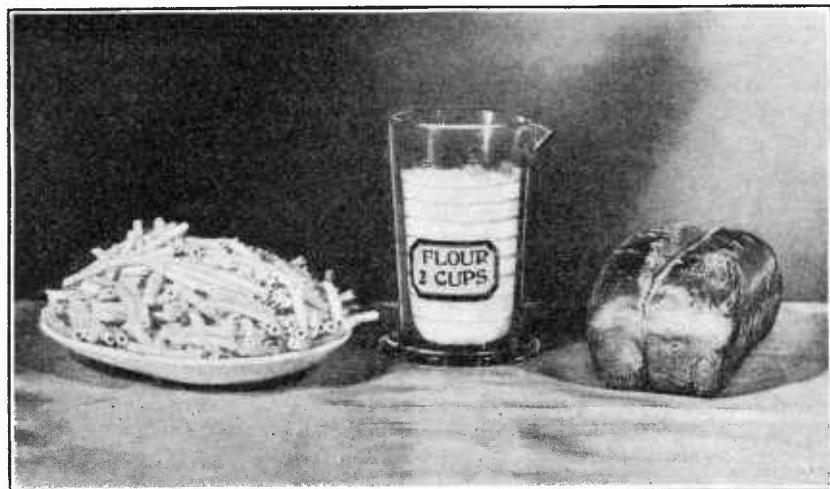


FIG. 1.—Flour, bread, and macaroni in quantities having the same general food value.

chiefly causes the difference, does not give to the entire four cupfuls any more body fuel or building material than was in the original cupful. Hence we must not judge the food value of cooked cereals merely by the size of the finished dish, but must remember that the raw food material has been diluted, so that a cupful cooked may have only a quarter the food value of a cupful of the raw grain. If the body-building protein makes up about one-eighth of the raw grain, it may make up only about one-fiftieth of the weight of cooked porridge.

If the cereal were cooked in skim milk, which itself is rich in protein, this valuable material would be taken up by the cereal and the cooked dish would be by that much more nutritious than if cooked in water. A cupful of rice cooked slowly in a double boiler can be made to take up six cupfuls of skim milk, and the amount of tissue-

building material and vitamins in the cooked dish is much greater than in the rice alone.

The food value of such foods as breads, rolls, biscuits, crackers, doughnuts, and cakes which have flour as an important ingredient depends, of course, on the kinds and amounts of the foods used. The relative proportions of protein, fat, starch, and other nutrients in bread mixed with water are much the same as in the flour itself. Its food value per pound is less, however, because of the added water. Eggs and milk, particularly skim milk, raise the proportion of tissue building material; fat and sugar lower it. In most cakes the proportion of protein to fat, starch, and sugar is lower than in flour or ordinary bread, but in sponge cake it is larger. Raisins, besides giving a variety of flavor, raise the proportion of mineral substances, particularly iron.

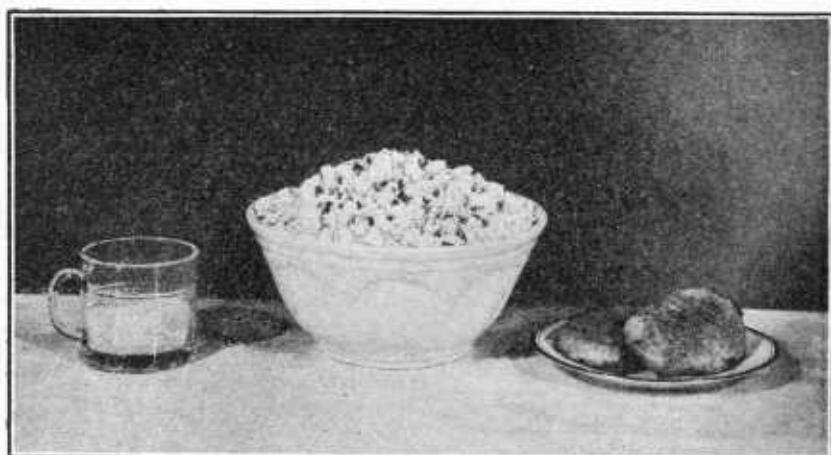


FIG. 2.—Corn meal, pop corn, and corn pone in amounts having the same general food value.

HOW MUCH CEREAL FOOD SHOULD BE USED?

Cereal food of one kind or another forms a large part of almost every wholesome and economical diet. As a general rule, the greater the part played by cereals the cheaper the diet. Up to a certain point one may cut down the quantity of meat, eggs, butter, fruits, and vegetables used and substitute cereal foods, but there is a limit beyond which this can not be safely done. The sample day's ration for a family of father, mother, and three young children, discussed in a former bulletin of this series,³ was planned to use cereals as freely as is considered wise. It contained about 3 pounds of bread, or its equivalent in a variety of cereal foods, 2 quarts of milk, $1\frac{1}{2}$

³ Farmers' Bul. 808 (1917). How to Select Foods.—I. What the Body Needs.

pounds of medium-fat meat, 9 ounces of butter or other fat, 10 ounces of sugar, and 10 pounds of fruits and vegetables, fresh weight. In this diet the cereal foods supply about one-third of the protein.

Ways of using the different cereal foods to advantage are discussed in the pages that follow.

BREAD.

In most households bread is the chief cereal food and the commonest kind is wheat bread raised with yeast.

Rye is also used in making yeast-raised bread. Corn is very commonly used in bread, but usually in kinds raised by some quick method rather than by yeast. Rice, oats, and the other cereals are not so much used in bread as in other dishes.

Because bread is often really "the staff of life," it is very important to have it good. People's ideas may differ as to exactly how bread should taste or how it should be made, but in this country all are agreed that yeast-raised bread should be light and spongy, with a crisp, tender, golden-brown crust, and that it should be nutty and sweet in flavor. Heavy, soggy bread, when it is swallowed, forms tough lumps which the digestive organs can not work upon properly, and, if eaten day after day, may do serious harm. Every housekeeper should try, therefore, to provide light, well-baked bread for her family.

Bread making often seems one of the most difficult of household tasks, with very uncertain results. There are many good rules for making bread, but whatever rule is followed the secret of success

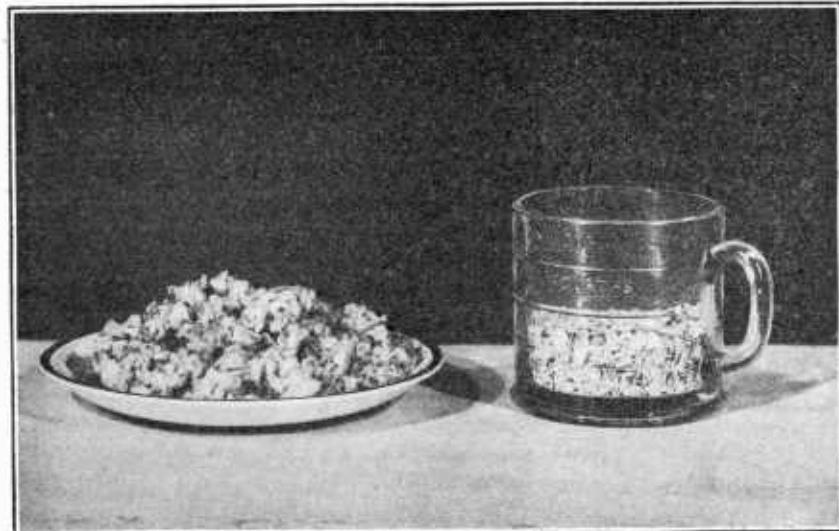


FIG. 3.—Half a cup of oatmeal before and after cooking.

lies in following the directions exactly. This means not only using exactly the right amounts of materials and working the dough for the right time, but also letting the yeast grow in it and stretch it to the right extent.

Though there are many good recipes for making bread, a close examination shows that they differ more in minor details than in the main points. Some housekeepers prefer to start their dough at night, some in the morning; and they also vary in the number of times they knead it, but however it is made the proportions of material used are very similar. For almost every kind of simple yeast-raised bread as made in the United States from ordinary bread flour the following proportions are used for one loaf:

1 cup liquid (water, milk, skim or whole, whey, or a mixture of two or more of them).

1 level teaspoon salt.

1 level tablespoon sugar.

3 cups sifted flour (or a very little more or less).

Yeast (one-eighth to one-half cake compressed yeast, depending on the length of time the dough is to stand. Liquid and dry yeast may be used, but the exact amount can not be so easily stated).

If more loaves are to be baked at one time, multiply the quantities given above by the number of loaves desired.

The following paragraphs give brief directions for making bread according to the methods most commonly used in American households:

SHORT OR STRAIGHT-DOUGH PROCESS.

Boil the water or scald the milk. Put the sugar and salt (and fat, if used) into a mixing bowl. Pour the hot liquid over it and allow

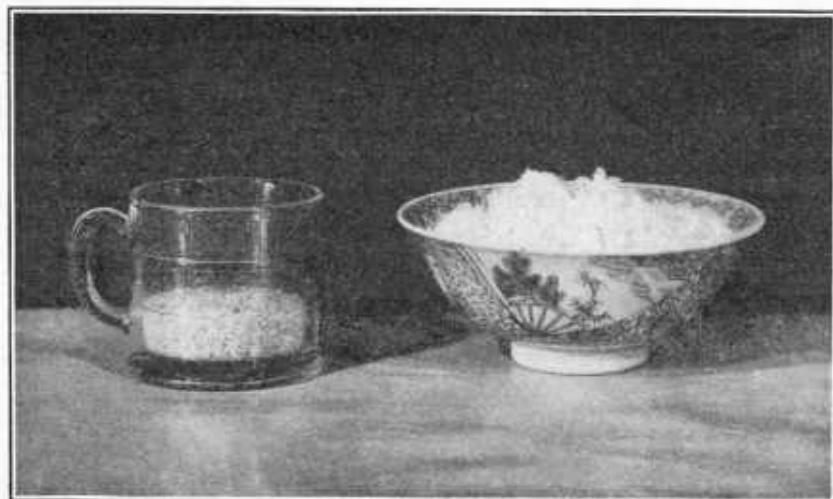


FIG. 4.—One-third of a cup of rice before and after cooking.

it to become lukewarm. Mix the yeast with a little of the lukewarm liquid and add it to the rest of the liquid. If convenient, set this aside in a warm place, not over 86° F., for one hour; if not convenient to set it aside, add the flour at once, putting in a little at a time and kneading until the dough is of such consistency that it sticks neither to the bowl nor to the hands. This requires about 10 minutes. Cover, and allow to rise 1½ hours at a temperature 86°; it may be better to set it at a lower temperature, but the lower the temperature the longer the time required for the rising. Cut down the dough from the sides of the bowl; grease the hands slightly. Knead a little and set aside to rise again for one hour. With a good bread flour, the dough would treble its bulk in each rising. With a soft wheat flour, it should not rise much beyond twice its volume. Divide into portions, mold, and place in greased pans. Allow to rise until a light touch will make a slight dent. Bake 50 minutes.

SHORT-SPONGE METHOD.

Bread can be made during the day by what is known as the "short-sponge" method. All the ingredients are the same as for the "short or straight-dough" process, but only half of the flour is added at first. When this mixture, which is called a "sponge," is so light that it will fall at the slightest touch, it is ready for the addition of the rest of the flour.

OVERNIGHT SPONGE METHOD.

Use the same proportions as for the short process, except in the case of the yeast, which should be one-eighth cake of compressed yeast or 2 tablespoonfuls of liquid yeast for each loaf. Use water rather than milk. In the evening mix the yeast with water, salt, and half of the flour, and beat thoroughly. Cover and place at a temperature of 65° to 70° F., or that of an ordinary room. In the morning add the sugar and the rest of the flour and proceed as in the case of the short process.

OVERNIGHT STRAIGHT-DOUGH METHOD.

Use the same ingredients as for the overnight sponge method, but put in all the ingredients at night.

If the following rules are observed the bread is almost sure to be of good quality and to keep well:

(1) Keep everything clean, protect the flour from dust, and scald all liquid ingredients thoroughly.

(2) Keep the dough between 65° and 86° Fahrenheit and do not allow it to stand longer than necessary.

(3) See that the dough when placed in the oven has three times the bulk of the dough when first made. Dough made with 1 cupful

of liquid will reach the top of a $1\frac{1}{2}$ -quart baking pan when it has tripled its bulk.

(4) Bake 45 to 60 minutes at about 400° Fahrenheit.

(5) Keep closely covered in a clean receptacle that is frequently scalded.

The principles of bread making are explained at length, and recipes for making different kinds of bread are given in another bulletin of this series.⁴

Some families are content with one kind of bread only, but others enjoy variety. There are many simple ways of obtaining it.

Yeast-raised bread can be made using graham, or the so-called whole-wheat flour instead of the usual bread flour. Or one may use two cups of wheat flour and one cup of cornmeal, oatmeal, peanut meal, soy-bean meal, or a corresponding amount of boiled rice or potato. Baking the dough in the form of biscuit or rolls instead of in a loaf changes not only its appearance but also its flavor, because in them there is more of the crisp brown crust in proportion to the crumb. Butter, sugar, raisins, nuts, and spice also give a variety which many families welcome now and then, as do caraway seed, aniseed, and poppy seed, used especially with rye bread.

There are many breads and biscuits raised with soda and sour milk or other mild acid, or with baking powder, which are often used instead of yeast-raised bread. If they are well made, they are perfectly wholesome. Unfortunately, in some parts of the country the biscuits are often made so large that the inside does not get thoroughly baked before the crust is done. Another rather common fault is using more soda than is needed. Too much soda not only injures the flavor, but may lessen, if not destroy, the growth-promoting substances in the bread.

Corn-meal breads raised by soda, baking powder, or eggs may also be freely used. Corn meal milled by modern processes does not make as moist bread as the old-fashioned type of meal, unless it is heated with water before the bread is mixed. If one understands this point, either kind of meal can be easily and satisfactorily used. Spoon breads made from corn meal or corn meal and rice are another kind, which varies the bread list. These are softer than ordinary bread, but not as soft as porridge or mush, and, unlike the latter, they have a distinct, well-browned crust.

Griddle cakes and pancakes are really a kind of thin bread cooked on a hot surface instead of in the oven, and in planning meals the wise house-keeper will think of them in this way. She will also remember that the butter and syrup often served with them yield valuable fuel, or energy, to the body.

LOW-PRICED QUICK BREADS.

A few recipes for low-priced quick breads are given below. In those raised by soda great care should be taken in measuring, as more soda than the acid of the sour milk can neutralize is believed to make the bread unwholesome. It is also important to have the bread thoroughly baked. The safest way is to make the biscuits or loaves small so that there may be a large proportion of browned crust.

⁴ U. S. Dept. Agr., Farmers' Bul. 807 (1917). Bread and Bread Making.

DROP BISCUITS.

2 cups white or whole-meal flour.	2 tablespoons lard or other fat.
1½ teaspoons salt.	1½ cups sour milk.
	¼ level teaspoon soda.

Sift the flour with the salt. Rub the lard or other fat into the flour by means of a fork or the fingers. Dissolve the soda in a little of the milk and add it, with the remainder of the milk, to the flour until a mixture is obtained that can be dropped from the end of a spoon. Bake on greased tins in a hot oven until brown.

SOUR-MILK CORN BREAD.

2 cups corn meal.	1½ teaspoons salt.
2 cups sour milk.	2 eggs.
2 tablespoons butter.	1 teaspoon soda.
2 tablespoons sugar, white or brown.	1 tablespoon cold water.

There are two ways of mixing this bread. By the first the meal, milk, salt, butter, and sugar are cooked in a double boiler for about 10 minutes. When the mixture is cool, the eggs are added well beaten and the soda dissolved in the water. By the other method all the dry ingredients, including the soda, are mixed together, and then the sour milk and eggs well beaten and the butter are added. If the second method is followed, the cold water is not needed. The bread should be baked in a shallow iron or granite pan for about 30 minutes.

CRISP CORN-MEAL CAKE.

1 cup milk.	½ teaspoon salt.
½ cup white corn meal.	

Mix the ingredients and heat slowly until the boiling point is reached. It is not necessary to stir. Spread on a shallow buttered pan to a depth of about one-fourth of an inch. Bake in a moderate oven until crisp.

SPOON CORN BREAD.

2 cups water.	1 tablespoon butter.
1 cup milk.	2 eggs.
1 cup white corn meal.	2 teaspoons salt.

Mix the water and the corn meal and bring slowly to the boiling point and cook 5 minutes. Add the eggs well beaten and the other ingredients. Beat thoroughly and bake in a well-greased pan for 25 minutes in a hot oven. Serve from the same dish with a spoon.

Crackers, also called biscuits in some regions, are really a kind of bread, baked very dry and usually in small and thin forms. Their food value, pound for pound, is very like that of twice-baked bread or rusks. Though usually they contain more fat, like bread, they are a wholesome and economical cereal food. Different flavorings and more or less shortening may be added in making them, and the crackers may be mixed and baked in different ways, so that the different kinds may not seem much alike. They do not usually vary as much in food value as they do in appearance. They are

often convenient, because they give variety and because on account of their dryness they stay fresh a long time if kept in an airtight box or wrapper. Crackers are rather bulky, and in buying them, as in buying breakfast cereals (see pp. 6 and 13), by the package, one should remember that it is not the size of the package but the weight of the crackers in it which shows how much food one is getting.

BREAKFAST CEREALS.

Next to their use in bread, crackers, cakes, and other baked goods, in this country the most common way of using the cereals for food is in the form of the so-called breakfast foods. Sometimes, as in the case of rice, cracked wheat, and old-fashioned or "Scotch" oatmeal, the grains are simply husked and perhaps slightly crushed before being cooked. Sometimes meals are used, as in corn-meal mush. Sometimes the grains are ground rather finely and the outside parts sifted out, as in farina. In other cases, as in the rolled-oat preparations, the grain is cleaned, partially cooked by steam, and then run between rollers, which flatten it out. In still other preparations the partly cooked cereal is ground into fine, granular form, or pressed into thin flakes which are baked crisp, or the whole grains are cooked under pressure so that they puff or pop up somewhat as does popped corn, which may be used as a breakfast cereal as well as in other ways. In some brands small quantities of sugar, glucose, malt, or other materials are added for the sake of flavor. Many of the devices used in preparing such breakfast foods are patented, and the products are often sold under proprietary names which may or may not suggest how the grains have been treated. What with all these methods of preparation, the list of varieties on the market is a long one, and the range of cost is great, especially when judged by the amount of food material actually supplied by a given quantity. All are wholesome foods.

As was shown on page 6, one can not judge the real cheapness or dearness of different kinds merely by the price paid for a package of a given size. Housekeepers who wish to be economical should note the net weight, which the law now requires to be marked on every package, and from this and the price reckon how much it costs per pound of material. They will find that, judged in this way, the simple flours and meals and the uncooked cereals (cracked wheat, coarse hominy or samp, unsteamed oatmeal, etc.) are usually the cheapest. When a preparation (steam-cooked oats, for example) can be bought either in package or in bulk, the cost of the package goods is usually, and quite justly, a little higher. Each housekeeper must decide for herself whether the greater convenience and attractiveness of the package goods is worth the difference in cost. The

larger her family is, and the more good storage space she has, the greater will probably be the advantage of buying in bulk. If she decides to do this, she should be careful to get cereals which have been kept in clean, closed bins or bags and to keep them as carefully after they reach her home.

Plain, uncooked cereals, such as cracked wheat, coarse hominy, and unsteamed oatmeal, usually cost less than the partially cooked preparations and the partially cooked ones less than the ready-to-eat kinds, as seems reasonable since fuel and labor are used in the factory where they are made. More or less fuel and labor are also needed to prepare cereals in the home, and a wise housekeeper reckons with these in deciding which kind is most truly economical in her own case. The coarse, uncooked ones need longer cooking than the partially cooked kinds, while the ready-to-eat kinds need no cooking, or only enough to make them warm and crisp. In a household where a coal fire is kept in the range all day no more fuel and not much more work are required for the long, slow cooking of cracked wheat or "Scotch" oatmeal than for factory-cooked brands; or where a fireless cooker is used such cereals may be easily and cheaply cooked. Where gas, electricity, or liquid fuel is used, and it is a matter of economy to plan for as short a use of the stove as possible, it may be cheaper to use steam-cooked ones. In light housekeeping the convenience of the ready-to-eat preparations often more than compensates for their high cost. The pleasant variety given by the use of cereals manufactured in the more elaborate ways may seem to the housekeeper to be worth a few cents extra. It is worth remembering, however, that bread and milk, rusks and milk, and crackers and milk all have much the same food value as breakfast foods and milk, and often furnish a convenient and inexpensive variety.

There are several practical points to remember in cooking cereals. One is that there is more danger of not cooking them enough than of cooking them too much. Uncooked cereal preparations, like cracked wheat and coarse samp, need several hours' cooking, and are often improved by being left on the back of the stove or in the fireless cooker overnight. Cereals partially cooked at the factory, such as the rolled or fine granular preparations, should be cooked fully as long as the directions on the package suggest.

Flavoring is also an important part of cooking cereals. The flavor most commonly added is salt. Such added flavor is perhaps less necessary in some of the ready-to-eat kinds which have been browned at the factory and have thus gained the pleasant flavor which also appears in the crust of bread and cake or in toast, but in the plain boiled cereals or mushes the careful use of salt in cooking them may

make all the difference between an appetizing and an unpalatable dish. A good general rule is 1 level teaspoonful of salt to each quart of water used in cooking the cereal.

Milk, cream, butter, sugar, or sirup are often added to breakfast cereals when they are eaten and make them more palatable to most persons. The materials also add to the food value of the whole dish. Too much sugar or sirup should not be used, especially by children, as it may spoil the taste for other important foods. If cereals are properly salted most persons will not wish to use as much sugar as they otherwise would.

When the raw cereal is poured into boiling water it must be constantly stirred to prevent its growing lumpy. This means unnecessary work, because ordinarily if the cereal is placed in cold water and heated slowly it needs no stirring at all; it will not lump. The best way to heat it slowly is in a double boiler, though with care it can be cooked directly on top of the stove. If so cooked, stirring is necessary only when very large quantities are prepared and the upper part presses heavily on the lower part or when the cereal itself is very fine.

CAKES, PASTRIES, PUDDINGS, SAUCES, AND OTHER DISHES RICH IN CEREAL.

These dishes, varied as they seem, all have this in common: They are made by combining more or less flour, rice, corn meal, cornstarch, or other cereal preparation with materials from other food groups. In cakes, cookies, and puddings, sugar, egg, shortening, and various flavorings are added. In pastry a large proportion of fat is used, not to mention the fruit, custard, mincemeat, or other materials used in pie filling. In pudding the cereal—flour, bread or cake crumbs, cornstarch, corn meal, rice, or whatever it may be—is often mixed with milk as well as with sugar, spice, fruit, or whatever gives the distinctive flavor. Flour, cornstarch, and crumbs are also used in thickening sauces and soups and in various other made dishes.

It should be remembered that each of the materials that goes into such dishes adds to their food value; the less water they contain, the greater the food value of an ounce or a pound; and the more tissue-building protein and mineral salts in the different materials used in making them, the more of these important food substances there must be in the whole dish. A dish of rice pudding which is more than half water is not as nutritious as the same weight of cookies which contain only about one-seventh water, and sponge cake made with eggs is richer in protein than pound cake in which butter is used to give the desired texture.

When a housekeeper tries to reckon how much of the family food is furnished by articles from the cereal group, the dishes in which more or less of some cereal preparation is combined with things from other groups prove more troublesome than the simpler ones, such as bread or breakfast cereals. Though it is rather hard to know exactly how much flour, corn meal, cornstarch, or other cereal will be used in cooking on any one day, it is fairly easy to notice how much is used each week for perhaps a month, and from this to estimate the average daily amount. By noticing this she will not only learn how much nourishment her family is getting from the cereal foods used in cooking, but she may also discover ways of economizing either by preventing waste or by using more of the simple and relatively inexpensive foods made from cereals, such as desserts and other dishes in which the flavor of sugar, spices, fruit, cheese, vegetables, meat, or fish gives pleasant variety.

ECONOMIES WITH CEREAL FOODS.

Choosing the cereal preparations which provide the most actual nourishment for the money spent is, generally speaking, an economical way of using this group of foods. After they have been purchased it is equally important from the standpoint of thrift to use them so that nothing will be wasted because of poor cooking and flavoring or of providing more than can be used.

It is generally admitted that more bread goes to waste in the average American home than almost any other kind of food. This happens mainly because many housekeepers do not know what to do with stale bread. Good fresh bread has a springy quality which disappears as it ages, probably because the water in it gradually passes from the center of the loaf out through the crust, leaving the bread drier and more crumbly. Many persons think bread is better when it has dried out a little, say for 24 hours, but almost everyone agrees that really stale bread is too dry to eat with enjoyment. Bread that has been cut grows stale more quickly than the uncut loaf, and unless the housekeeper plans very carefully, she is likely to find her bread box full of hard, dry slices and ends of loaves which are of no use on the table. To avoid this waste she may do two things: (1) Treat the bread so it shall not be unappetizing and (2) use the stale bread in cooking.

Toasting is the most common method for making stale or partly stale bread attractive, but it is by no means the only one. If partly stale bread is put into a very hot oven for a few minutes it grows softer, probably because the heat tends to drive the water from

the crust back into the crumb. Such warmed-over bread is not as soft and springy as fresh, but most persons find it very appetizing. A good plan, therefore, when bread has lost its freshness, is to cut off what will be needed at a meal and place the slices in a hot oven for a few minutes just before serving. In this way bread can be used on the table which would ordinarily be considered too stale.

"Twice-baked bread," which is cut bread placed in the warming oven, or in a pan on the back of the stove, and allowed to dry out very slowly until it is slightly brown and very crisp throughout, offers still another way of making stale bread attractive. If desired, this twice-baked bread may be crushed with a rolling-pin and used like the ready-to-eat breakfast cereals; in some localities this dish has long been known under the name of rusks. The little fried cubes of bread called "croutons," which are served with soup, may be made with odds and ends of bread. To save time, bread simply broken into small pieces may be fried either in deep fat or in a pan (*sautéed*) and used for the same purpose. Sometimes bread crumbs are fried in a pan for use in a similar way as a seasoning or sauce for meat. French cooks frequently put pieces of stale bread in soups just long enough before serving for them to soften; the well-known one called "crust in the pot" (*croûte au pot*) is simply a thin soup with bread in it.

There are many ways of using stale bread in cooking. Almost every good cookbook gives directions for preparing soft and dry crumbs for use in scalloped dishes, bread puddings, etc. The soft parts of the bread may be used in the place of flour or cornstarch for thickening soups, sauces, gravies, stewed tomatoes (either fresh or canned), etc. Bakers often use stale bread and dried, finely ground cake in place of part of the flour in making fancy breads, cakes, and cookies, and the housekeeper can often avoid waste by using them in this way in griddlecakes, cakes, cookies, etc.

The following recipes show how bread crumbs may be used instead of flour in various dishes. It will be noticed that nearly all the materials used in the soup are those that are often thrown away—skim milk, the outside leaves of lettuce, and stale bread.

VEGETABLE-SKIM-MILK SOUP.

- | | |
|--|-----------------------|
| 1 quart skim milk. | A few celery tips, or |
| 1 slice stale bread. | A thin slice onion. |
| 2 ounces of the outer leaves of
lettuce (6 large leaves). | Salt and pepper. |

Chop the vegetables finely. A convenient way, particularly if the soup is being made in large quantities, is to use a food grinder and to put the bread through it with the vegetables to catch the juice. Cook the finely chopped vegetables and the bread in the milk in the double boiler for about 20 minutes. Season.

CHEESE FONDUE.

1½ cups soft, stale bread crumbs.	4 eggs.
6 ounces cheese (1½ cups cheese grated fine or cut into small pieces).	1 cup hot water or skim milk. ½ teaspoon salt.

Mix the water, bread crumbs, salt, and cheese; add the yolks thoroughly beaten; into this mixture cut and fold the whites of eggs beaten until stiff. Pour into a buttered baking dish and cook 30 minutes in a moderate oven. Serve at once.

PANCAKES.

1 cup crumbs.	1 teaspoon salt.
2½ cups skim milk.	1 teaspoon sugar.
½ cup flour.	1 teaspoon melted fat.
4 teaspoons baking powder.	1 egg.

Soak crumbs in milk for three-quarters of an hour. Then add other ingredients and cook on a hot griddle like ordinary pancakes. If sour milk is used, substitute ½ teaspoon soda for the 4 teaspoons baking powder.

GINGERBREAD.

1 cup molasses.	1½ teaspoons ginger.
½ cup boiling water.	½ teaspoon salt.
1½ cups fine bread crumbs.	4 teaspoons melted lard or other fat.
¾ cup flour.	
1 teaspoon soda.	

Add water to molasses and combine with the dry ingredients mixed together, then add butter and beat. Bake for about 25 minutes in a hot oven.

INDIAN PUDDING MADE WITH CRUMBS.

1 cup fine crumbs (corn bread or wheat bread).	2 tablespoons melted butter or other fat.
1 quart skim milk.	¼ teaspoon ginger.
½ cup sugar.	¼ teaspoon cloves.
¼ cup molasses.	¼ teaspoon cinnamon.

Scald the crumbs in milk, add the other ingredients, and bake 1½ hours in a slow oven.

Stale crackers serve many of the same uses as stale bread. If they have lost their crispness, they, too, can usually be freshened by warming in the oven, and the fine crumbs may be used in the same way as dried bread crumbs.

The texture of stale cake and cookies is not so easily improved by heating, but they may be dried, crushed, and used like bread crumbs wherever their flavor and texture allow.

Remnants of cereal breakfast foods may often be utilized to make palatable dishes, to thicken soups or other foods, and in similar ways. For instance, small quantities of cooked cereal left over from a meal can be molded in cups and reheated for later use by setting the cups in boiling water. Another way to economize cereal mushes is to add hot water to any mush left over so as to make it very thin. It can

then easily be added to a new supply. The practice of frying the left-overs of boiled hominy or of corn-meal mush is as old as the settlement of this country, and the nursery song about the "bag pudding the queen did make" from King Arthur's barley meal shows us that for centuries other cereal puddings have been treated in the same way. In so-called oatmeal oysters, left-over cereal is dipped in eggs and crumbs and fried. The use of left-over rice and other cereals in croquettes, puddings, and so on is too well known to need more than mention.

Cold cooked farina or similar cereal may be utilized in the following ways. The second recipe is less economical because of the use of egg and more milk.

FARINA PUDDING.

RECIPE NO. 1.

1 cup cold, cooked farina.	$\frac{1}{2}$ cup seeded raisins.
$\frac{1}{2}$ cup milk.	$\frac{1}{8}$ teaspoon cinnamon.
$\frac{1}{8}$ cup sugar.	A speck of ground cloves.

Bake until brown, or heat on top of the stove.

RECIPE NO. 2.

1 cup cold, cooked farina.	$\frac{1}{2}$ cup sugar.
1 tablespoon cornstarch.	$\frac{1}{2}$ cup seeded raisins.
1 egg.	$\frac{1}{8}$ teaspoon cinnamon.
1 cup milk.	A speck of ground cloves.

Bake in a medium oven until brown, or heat on top of the stove.

Dried figs or dates or stewed fruit may be substituted for the raisins in either of these puddings.

Boiled rice and pearl barley are often used in soup, and there is no reason why small quantities of coarse samp or any other cereal which will keep its shape fairly well should not be used up in the same way. Similarly, remnants of macaroni broken into small pieces may be used in the place of vermicelli or other special soup pastes. Such practices serve the double purpose of using material which would otherwise be wasted and of giving a little variety to a simple diet by inexpensive means.

In many places good, clean, whole wheat can be obtained quite as easily and cheaply as the common cereal preparations. It is possible to grind this in a mill like an ordinary coffee grinder so that it is as fine as old-fashioned cracked wheat, or even to a meal fine enough for bread making. When coarsely ground, such home-ground wheat makes an excellent breakfast cereal. Bread can be made entirely of the home-ground meal, but it is lighter and more delicate in flavor if half ordinary flour and half wheat meal are used. Grinding the grain, of course, takes time, and such home products are not recommended to take the place of others entirely. Occasionally, however,

and especially when bran is needed in the diet (see p. 6), they may furnish a wholesome variety at low cost.

If other cereals cost less than wheat flour, the cost of bread may be lessened by using some of them in place of part of the flour. Good yeast-raised bread can be made with corn meal, rice, oatmeal, potatoes and other starchy foods, in place of at least one-third of the flour. The food value of such breads varies according to the food value of the material used, but the differences are not likely to be of importance when the diet is otherwise generous.

POTATOES AND SWEET POTATOES USED LIKE CEREALS.

Potatoes and sweet potatoes are so rich in starch and so mild in flavor as compared with most vegetables that they are often used to supply fairly large amounts of body fuel without giving very decided taste to the diet. Raw potatoes contain more water than raw cereals, but when cooked they have much the same fuel value, pound for pound, as the cereals which have been cooked in water. A cupful of boiled potato would furnish the body with about as much energy as a cupful of boiled rice.

There are, however, some differences between the food value of these starchy foods and that of the cereals which must not be overlooked. They contain less fat and protein than most cereals, but, on the other hand, they furnish the body with a larger proportion of mineral substances. On this account they really belong in the food group with vegetables and fruits, rather than with the cereals. Nevertheless, because of the starch they contain and the ways in which they are combined in bills of fare with foods of more distinctive flavor they should be mentioned in connection with the cereals.

SUMMARY.

Cereals are mild-flavored, nutritious foods, which, in one form or another, make up a large part of most wholesome and inexpensive diets.

They are all rich in starch, which furnishes the body with fuel, or energy. They also furnish some tissue-building and body-regulating materials; these are more abundant in wheat, rye, and oats than in rice and corn.

The outer coating of the grain contains valuable mineral matters and vitamine. The parts near the germ also contain vitamine. These are also found in milk, eggs, fresh fruits, and vegetables. In some cases, especially where there is a tendency to constipation or where the other foods are not abundant, bread or breakfast cereals made with whole wheat, unpolished rice, and other cereal foods containing the outer parts of the grain are particularly valuable. Otherwise white flour or bread and polished rice are as valuable and wholesome as the whole-grain products.

The water added to cereal foods during cooking increases the bulk of the finished dish, but not its food value. One cupful of oatmeal may make four cupfuls of porridge, but the four would yield no more

nourishment than was found in the original cupful of meal. In the same way, 3 cupfuls of flour has about the same food value as the pound loaf of bread into which it may be made.

Well-made bread of any kind is a wholesome and valuable food. Heavy, or underbaked, bread, if eaten day after day, may cause unpleasant digestive disturbance.

Waste of stale bread may be avoided (1) by freshening, toasting, or drying it to use instead of fresh bread, and (2) by using it in cooking in place of flour or starch.

Waste in breakfast foods and other cereal dishes may be avoided by serving only as much as is likely to be needed, and also by using any left-overs, reheating them, or in some way combining them with other food materials in cooking.

Breakfast cereals bought in bulk usually cost less than package goods, and raw cereals less than those which have been partly or entirely cooked at the factory.

In buying package goods, either breakfast cereals or crackers, one should judge the cost not merely by the size of the package but by the weight of the food in it.

Because cereals are relatively low in price and because most of them furnish some tissue-building materials as well as body fuel, it is good economy to use them freely and sometimes in the place of part of the more expensive foods.

**PUBLICATIONS OF THE U. S. DEPARTMENT OF AGRICULTURE OF
INTEREST IN CONNECTION WITH THIS BULLETIN.**

AVAILABLE FOR FREE DISTRIBUTION BY THE DEPARTMENT.

Care of Food in the Home. (Farmers' Bulletin 375.)

Pop Corn for the Home. (Farmers' Bulletin 553.)

Use of Corn, Kafir, and Cowpeas in the Home. (Farmers' Bulletin 559.)

Food for Young Children. (Farmers' Bulletin 717.)

How to Select Foods: I. What the Body Needs. (Farmers' Bulletin 808.)

How to Select Foods: II. Foods Rich in Protein. (Farmers' Bulletin 824.)

Use of Wheat Flour Substitutes in Baking. (Farmers' Bulletin 955.)

Baking in the Home. (Farmers' Bulletin 1136.)

Rice as Food. (Farmers' Bulletin 1195.)

A Week's Food for an Average Family. (Farmers' Bulletin 1228.)

The Peanut, A Great American Food. (Yearbook Separate 746.)

Use Soy Bean Flour to Save Wheat, Meat, and Fat, with Recipes. (Office of Secretary, Circular 113.)

Standards of Purity for Food Products. (Office of Secretary, Circular 136.)

FOR SALE BY THE SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.

Principles of Nutrition and Nutritive Value of Food. (Farmers' Bulletin 142.)
Price, 5 cents.

Cereal Breakfast Foods. (Farmers' Bulletin 249.) Price, 5 cents.

Cowpeas. (Farmers' Bulletin 318.) Price, 5 cents.

Corn Meal as a Food and Ways of Using It. (Farmers' Bulletin 565.) Price, 5 cents.

School Lunches. (Farmers' Bulletin 712.) Price, 5 cents.

Potatoes, Sweet Potatoes, and Other Starchy Roots as Food. (U. S. Department of Agriculture Bulletin 468.) Price, 5 cents.

Dasheen, Its Uses and Culture. (Yearbook Separate 689.) Price, 5 cents.

HOW TO DO IT.

DO YOU want practical suggestions on how to build a silo, a hog house, a poultry house, a potato storage house, or how to make a fireless cooker, or other farm home convenience? Are you seeking ideas on how to prepare vegetables for the table, how to care for food in the home, how to bake bread and cake and other appetizing foods in an efficient and economical manner? Is there some practical question about your corn or wheat or cotton or other crops, or about your poultry or live stock, to which you are seeking an answer? The answers to thousands of such questions and practical suggestions for doing thousands of things about the farm and home are contained in over 500 Farmers' Bulletins, which can be obtained upon application to the Division of Publications, United States Department of Agriculture, Washington, D. C.